

# Pest Alert

## Diplodia corticola “Bot Canker” of Oak

*Diplodia corticola* and *D. quercivora* have been implicated in causing dieback, branch and stem cankers, and mortality of native oaks (*Quercus* spp.) in the United States. The origin of these species is currently unresolved. Other members of the fungal family Botryosphaeriaceae are common pathogens that cause fruit rot and dieback of many woody plants throughout the world.

### Hosts and Current Range

Recent surveys found *D. corticola* to be widespread throughout the Eastern United States. Since 2016, *D. corticola* has been reported causing mortality of northern red oak (*Q. rubra*) in rural stands in West Virginia and Maine, bleeding cankers on black oak (*Q. velutina*) in Massachusetts, branch cankers on northern red oak in Pennsylvania, and stem cankers on northern red and white oak (*Q. alba*) in Wisconsin. In 2010 it was found to be associated with tip dieback and branch cankers on landscape live oak (*Q. virginiana*) in Florida. *D. corticola* was first reported causing death of canyon live oak and coast live oak (*Q. chrysolepis* and *Q. agrifolia*, respectively) in California during 2010; however, it was likely an important factor in the deaths of thousands of acres of these two species since before 2002. *D. corticola* was identified as a chief cause of a serious decline of cork oak (*Q. suber*) and holm oak (*Q. ilex*) in the Iberian Peninsula and the Mediterranean Basin since the 1980s and of sessile oak (*Q. petrea*) in France since 2013. This pathogen has also been documented as the cause of cankers on grapevine in Europe, Texas, California, and Mexico. *D. quercivora* has been found causing shoot dieback and branch cankers on multiple oak species in Maryland (chestnut oak (*Q. montana*)), West Virginia, Massachusetts, Florida, Tunisia, and Portugal.

### Infection Process

It is unknown how *D. corticola* and *D. quercivora* colonize oak; however, other members of the family Botryosphaeriaceae are opportunistic pathogens and often live in host tissues without symptoms, only becoming pathogenic when conditions are conducive to disease development. These predisposing stresses may include environmental factors such as transplanting, pruning, herbicide, insect damage, and water stress. Other members of Botryosphaeriaceae enter plants through wounds, leaf scars, or stomata open for gas exchange. Spores are suspected to be spread by air, water splash, insects, or contaminated pruning tools. Moisture and high humidity favor spore production and germination.

### Identification and Description

Symptoms of infection of oak by *Diplodia* include branch and stem cankers. The bark above cankered regions may have a black, sooty appearance (figure 1) with bark cracks that often exude an amber-colored sap. A dark amber or black necrotic lesion can be observed following removal of the bark (figure 2). Branch cankers are common on infected oaks in urban environments (figure 3). Branch cankers often bear tiny, black, flask-shaped asexual fruiting bodies (pycnidia) that erupt through dead bark. Pycnidia are produced within 24 weeks and continue to produce spores for about 2 years. The presence of bleeding cankers is not diagnostic on its own because injury and other pathogens, such as *Phytophthora* spp., may cause bleeding cankers.

When grown on agar media, *D. corticola* and *D. quercivora* appear fluffy white when viewed from above (figure 4) with a dark green to black underside. *Diplodia* spp. have very similar morphology; therefore, the most reliable way to identify these species is by DNA sequencing of the internal transcribed spacer region of cultured samples.

### Control

Because members of Botryosphaeriaceae are typically opportunistic pathogens, maintaining plant vigor and avoiding tree stress could be a useful strategy in preventing infection and colonization. Cleaning pruning tools with disinfectants may help prevent spread of this fungus. Avoid pruning during periods of high rainfall (when spores are most likely to be released). Destroy infected branches after removal





Figure 1.—Cankered region on northern red oak caused by *Diplodia corticola* infection.



Figure 2.—Cankered region on black oak caused by *Diplodia corticola* infection.



Figure 3.—Cankers on a northern red oak branch caused by *Diplodia corticola* infection.

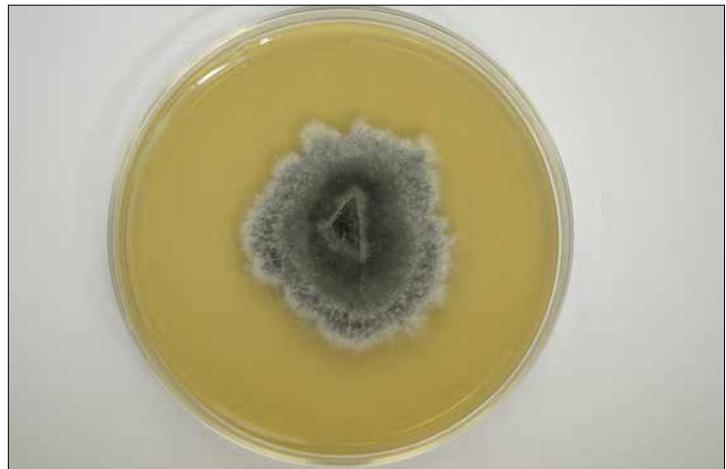


Figure 4.—*Diplodia corticola* grown 7 days on glucose yeast extract agar.

and avoid transporting infected wood material long distances. Fungicide treatments have been effective in reducing incidence of cankers on *Q. suber* in Europe. Fungicide tests in the U.S. are underway to determine the effectiveness and expand fungicide labels.

### Be on the Lookout

If you observe symptoms of infection by *D. corticola* or *D. quercivora* on oaks, please contact your local forest health specialist, State Extension Service, or State Departments of Agriculture and Forestry. For more information contact [Danielle Martin](#) or [Isabel Munck](#).

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### Photographs:

Figures 1, 2, and 4: Danielle K. Martin, USDA Forest Service

Figure 3: Tim Tomon, Western Area Forest Health Specialist, PA Bureau of Forestry, Division of Forest Health

